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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/670,673	09/25/2003	Bruce K. Wachtmann	2550/185	6398
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BROMBERG & SUNSTEIN LLP 125 SUMMER STREET BOSTON, MA 02110-1618			EXAMINER PIZARRO CRESPO, MARCOS D	
			ART UNIT	PAPER NUMBER
			2814	

DATE MAILED: 08/09/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/670,673

Applicant(s)

WACHTMANN, BRUCE K.

Examiner

Marcos D. Pizarro-Crespo

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 13 July 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 and 3-20 is/are pending in the application.
- 4a) Of the above claim(s) 9-14 and 20 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3-8 and 15-19 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☒ Claim(s) 1 and 3-20 are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____

Attorney's Docket Number: 2550/185

Filing Date: 9/25/2003

Claimed Priority Date: 12/3/2002 (CIP of 10/308,688)

Applicant(s): Wachtmann

Examiner: Marcos D. Pizarro-Crespo

DETAILED ACTION

This Office action responds to the amendment filed on 7/13/2005.

Acknowledgment

1. The amendment filed on 7/13/2005 responding to the Office action mailed on 5/18/2005 has been entered. The present Office action is made with all the suggested amendments being fully considered. Accordingly, pending in this Office action are claims 1 and 3-20.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1, 3 and 15-18 are rejected under 35 U.S.C. 102(b) as being anticipated by Barron (US 5919548).

4. Regarding claim 1, Barron shows (see, e.g., figs. 3a-4c) all aspects of the instant invention including a method of forming a surface micromachined MEMS device, the method comprising:

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- ✓ Providing a substrate **10**
- ✓ Applying an insulator **16** on the substrate **10**
- ✓ Depositing a conductive path **20** on the insulator **16**
- ✓ Forming circuitry **300** and structure **200** (see, e.g., figs. 3r and 4c)
- ✓ Connecting the conductive path **20** between the circuitry **300** and the structure **200** (see, e.g., fig. 4c)

wherein:

- ✓ The conductive path is capable of transmitting an electronic signal between the circuitry and the structure (see, e.g., col.7/II.46)
- ✓ The insulator electrically isolates the path from the substrate
- ✓ The device is free of semiconductor junctions formed by the substrate and the conductive path (see, e.g., fig. 3c)

5. Regarding claims 3 and 16, Barron shows the structure is electrically isolated from the substrate (see, e.g., figs 3r and 4c).

6. Regarding claim 15, Barron shows (see, e.g., figs. 3a-4c) all aspects of the instant invention including a method of forming a sensor, the method comprising:

- ✓ Forming an insulator on a substantially intrinsic semiconductor substrate **10**
- ✓ Forming a conductive path **20** on the insulator **16**
- ✓ Forming circuitry **300** and structure **200** (see, e.g., figs. 3r and 4c)
- ✓ Connecting the conductive path **20** between the circuitry **300** and the structure **200**

wherein:

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- ✓ The insulator **16** and the conductive path **20** are formed by surface micromachining processes (see, e.g., col.7/ll.59-67, col.12/ll.7-10)
- ✓ The insulator **16** electrically isolates the conductive path **20** from the substrate (see, e.g., fig. 4a)
- ✓ The conductive path **20** is capable of transmitting an electronic signal between the circuitry **300** and the structure **200** (see, e.g., col.7/ll.45-49)

7. Regarding claim 17, Barron shows the MEMS device is free of semiconductor junctions between the substrate **10** and the conductive path **20** (see, e.g., fig. 4a).

8. Regarding claim 18, Barron shows the method further comprising:

- ✓ Applying an additional insulator **24** above the conductive path **20**
- ✓ Depositing an additional conductive path **38** on the additional insulator **24**

wherein the conductive path **20** and the additional conductive path **38** are in different planes of the MEMS device **200** (see, e.g., figs. 3k and 4c).

9. Regarding claim 1, Montague (see, e.g., fig. 1) shows all aspects of the instant invention including a method of forming a surface micromachined MEMS device **12**, the method comprising:

- ✓ Providing a substrate **14**
- ✓ Applying an insulator **22** on the substrate **14**
- ✓ Depositing a conductive path **24** on the insulator **22**
- ✓ Forming circuitry **16** and structure **26**
- ✓ Connecting the conductive path between the circuitry **16** and the structure **26**

wherein:

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- ✓ The conductive path **24** is capable of transmitting an electronic signal between the circuitry **300** and the structure **26**
- ✓ The insulator **22** electrically isolates the path **24** from the substrate **14**
- ✓ The device is free of semiconductor junctions formed by the substrate **14** and the conductive path **24**

10. Regarding claim 4, Montague shows (see, e.g., fig. 10) the method further comprising:

- ✓ Applying an additional insulator **42** above the conductive path **24**
- ✓ Depositing an additional conductive path **44** to the additional insulator **42**

wherein the conductive path and the additional conductive path are in different planes of the device.

11. Regarding claim 5, Montague shows the method further comprising electrically connecting the conductive path **24** and the additional conductive path **44** with a connector **28**, the connector **28** being one of a via and a staple (see, e.g., fig. 10).

12. Regarding claim 6, Montague shows the insulator **22** spacing the conductive path **24** from the substrate **14** (see, e.g., fig. 4).

13. Regarding claim 7, Montague shows the substrate **14** is free of embedded electrodes (see, e.g., fig. 2).

14. Regarding claim 8, Montague shows the conductive path **24** comprises polysilicon (see, e.g., col.6/ll.47).

Claim Rejections - 35 USC § 103

15. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

16. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Barron in view of Fladre (US 2004/0152272).

17. Regarding claim 19, Barron shows most aspects of the instant invention (see, e.g., paragraph 6 above). Barron also teaches that the insulator is an oxide having a thickness of about .06 μm (see, e.g., col.7/ll.30-32) but fails to show the claimed thickness of .15 to 1.5 μm . However, differences in thickness will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such differences are critical. "Where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the workable ranges by routine experimentation". *In re Aller*, 220 F.2d 454,456,105 USPQ 233, 235 (CCPA 1955). Along these lines, Fladre teaches (see, e.g., par. 0050) that the larger the thickness of Barron's oxide layer is, the more the parasitic capacitance between the conductive path and the substrate will be reduce. The original thickness of Fladre's oxide layer ranges from .400 to 1.000 μm (see, e.g., par. 0048).

Based on the teachings of Fladre, the specific claimed thicknesses, are only considered to be the "optimum" thicknesses disclosed by Barron that a person having ordinary skill in the art would have been able to determine using routine experimentation

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based, among other things, on the desired reduction in parasitic capacitance, manufacturing costs, etc. (see Boesch, 205 USPQ 215 (CCPA 1980)), and since neither non-obvious nor unexpected results, *i.e.*, results which are different in kind and not in degree from the results of the prior art, will be obtained as long as an oxide insulator separates the conductive path from the substrate, as already suggested by Barron.

Accordingly, since the applicants have not established the criticality (see next paragraph below) of the stated thicknesses and since these thicknesses have been in common use in similar devices in the art, as shown by Fladre, it would have been obvious to one of ordinary skill in the art to use these values in the method of Barron.

CRITICALITY

18. The specification contains no disclosure of either the critical nature of the claimed thicknesses or any unexpected results arising therefrom. Where patentability is said to be based upon particular chosen dimensions or upon another variable recited in a claim, the applicant must show that the chosen dimensions are critical. *In re Woodruff*, 919 F.2d 1575, 1578, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990).

Response to Arguments

19. The applicant argues:

Among other things, the claimed method deposits a conductive path on an insulator that was applied to a substrate. This conductive path connects between the circuitry and the structure. Barron does not teach such a process. In making the rejection, the examiner suggests that elements 20 connect structure 200 with circuitry 300. Barron, however, defines elements 20 as "first-level functional elements" of the MEMS device. These elements are end points, which are part of the MEMS structure, and not interconnect devices. As such, if they are to connect with the circuitry 300, the functional elements 20 themselves require conductive paths. Accordingly, amended claim 1 is allowable since Barron fails to show a conductive path that connects between the circuitry and the structure.

The examiner responds:

In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (*i.e.*, interconnect devices) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read

into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

The claims, however, do recite limitation with respect to a step of connection a conductive path between the structure and circuitry regions of a device. Barron clearly shows a step of depositing a conductive path **20** on an insulator **16** that was applied to a substrate **10**. See, e.g., fig. 3d. The fact that elements **20** are “first-level functional elements” of the MEMS device does not oppose the fact that these elements connect structure **200** with circuitry **300**. Barron indicates that elements **20** are joined together to form an electrostatic actuator (see, e.g., col.7/ll.54-56). As it is known in the art (see, e.g., Barron), an electrostatic actuator moves a MEMS device by electrostatic attraction between the released structures of the device and the actuator. In other words, Barron’s released structure and elements **20** are connected together by electrostatic forces.

Barron also indicates that elements **20** are connected to the electronic circuitry **300** by metallization **48** (see, e.g., col.12/ll.38-42). That is, there is a conductive path from circuitry **300** through metallization **48** to the electrostatic actuator **20**, which is connected to the released structure of the MEMS device **200** via electrostatic actuation. The fact that there is another metallization (conductive path) **48** between elements **20** and circuitry **300** does not oppose the fact that elements **20** are also a conductive path between the released structure of the MEMS device and the circuitry. In fact, the applicant shows a similar configuration to Barron. See, e.g., fig. 8 of the instant application, where the applicant shows a conductive path **24**, which is part of the

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structure region (just as Barron's conductive elements **20** are part of the MEMS device **200**). The path **24** connects between the structure **32** and the circuit region by means of metal contact **20**. As depicted in the figure, the structure **32** is part of the structure region (just as Barron's released structure is part of the MEMS region). The fact that the metal contact **20** is part of the connection between the circuit and structure regions does not oppose the fact that conductive path **24** is still a conductive path connected between the regions. Likewise, Barron's elements **20** are also a conductive path between the MEMS **200** and the circuitry **300** regions even though there are other elements (e.g., metallization **48**) completing the connection between the regions.

Conclusion

20. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

21. A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

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22. Papers related to this application may be submitted directly to Art Unit 2814 by facsimile transmission. Papers should be faxed to Art Unit 2814 via the Art Unit 2814 Fax Center. The faxing of such papers must conform to the notice published in the Official Gazette, 1096 OG 30 (15 November 1989). The Art Unit 2814 Fax Center number is **(703) 872-9306**. The Art Unit 2814 Fax Center is to be used only for papers related to Art Unit 2814 applications.

23. Any inquiry concerning this communication or earlier communications from the examiner should be directed to **Marcos D. Pizarro-Crespo** at **(571) 272-1716** and between the hours of 9:30 AM to 8:00 PM (Eastern Standard Time) Monday through Thursday or by e-mail via Marcos.Pizarro@uspto.gov. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy, can be reached on (571) 272-1705.

24. Any inquiry of a general nature or relating to the status of this application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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25. The following list is the Examiner's field of search for the present Office Action:

Field of Search	Date
U.S. Class / Subclass(es): 438/52, 453	8/3/2005
Other Documentation: PLUS Analysis	5/12/2005
Electronic Database(s): EAST (USPAT, EPO, JPO)	8/3/2005

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